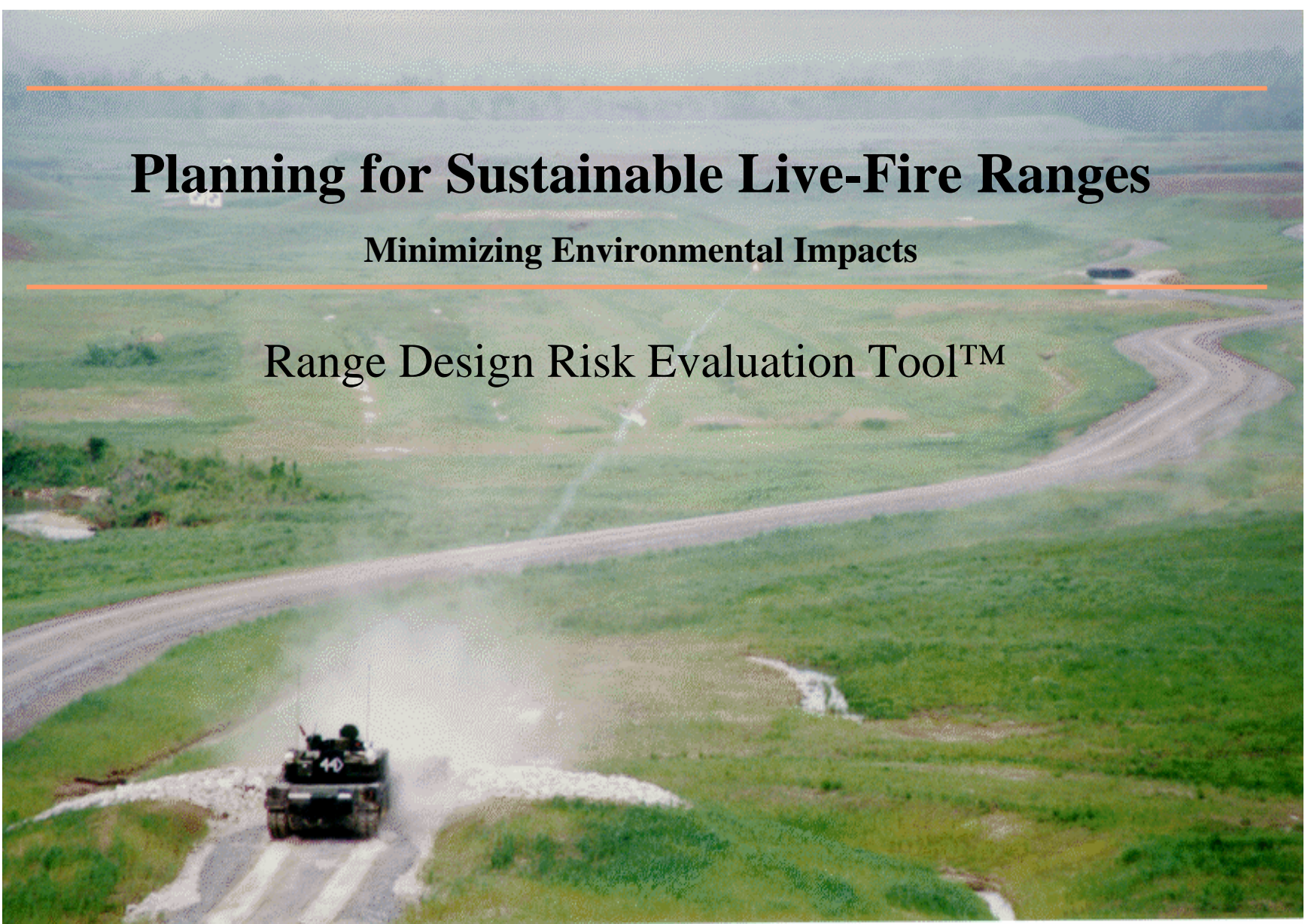


Planning for Sustainable Live-Fire Ranges

Minimizing Environmental Impacts

Range Design Risk Evaluation Tool™



Paul Loechl, ERDC-CERL

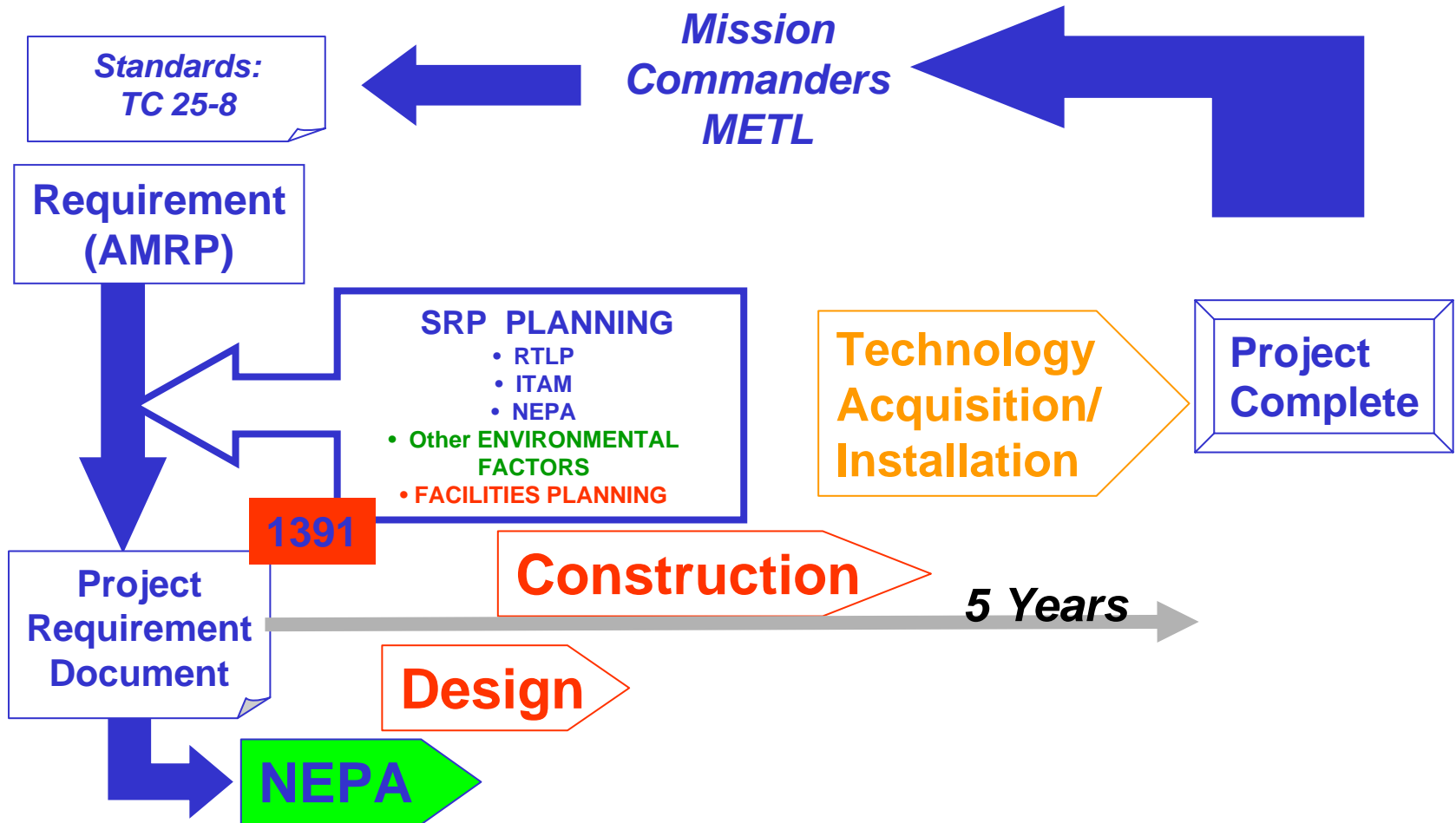
Sharing Future Space Symposium

April 11-12 2006

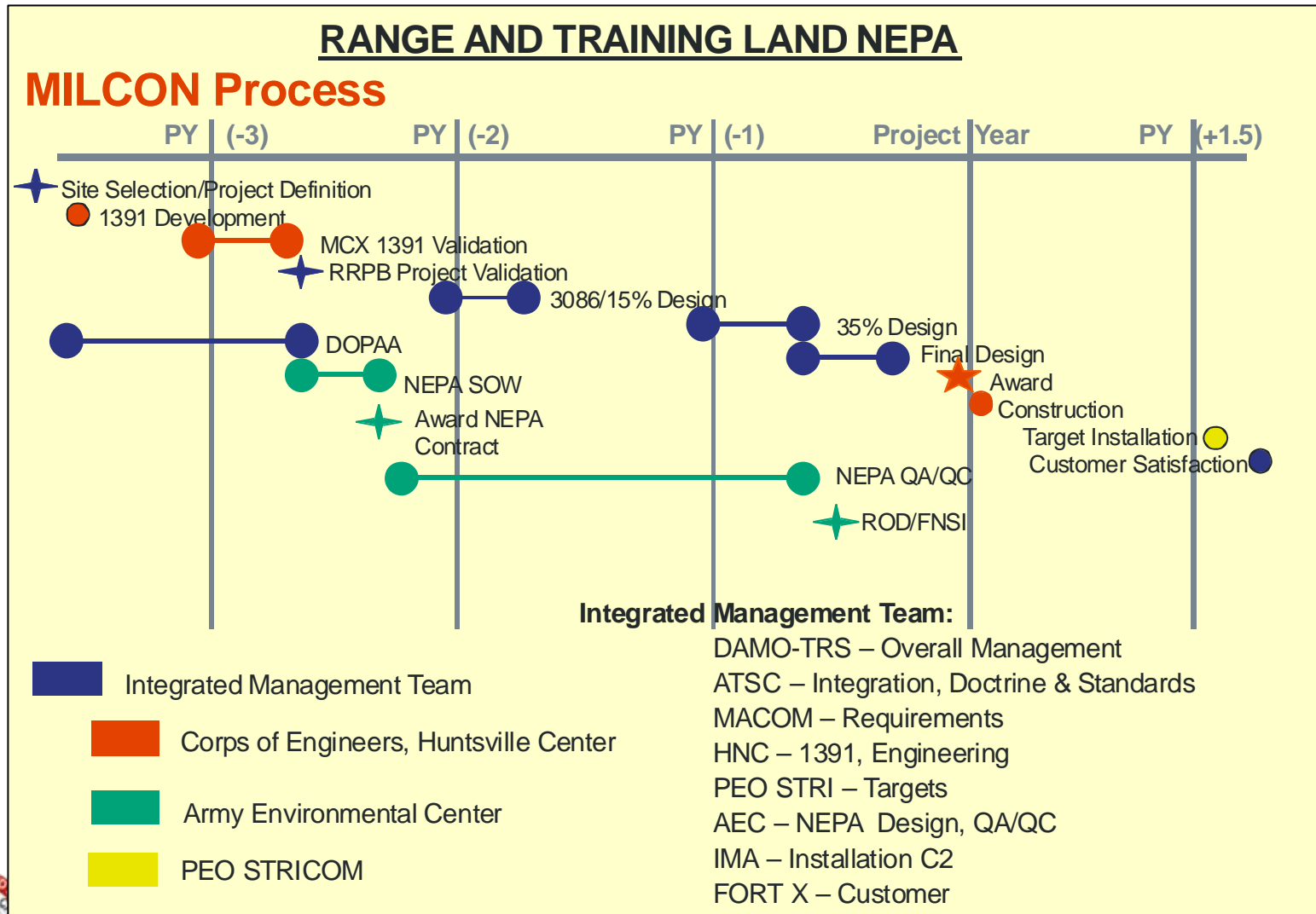


Range Risk Assessment

Army Range Modernization Process



Range Planning



Range Design Risk Evaluation Tool - Approach

Project Information

- FCC
 - Range type
 - Activities
 - Targets
 - Firing points
- Addn. activities
- Size

Site Information

- Location
- Natural and cultural attributes
- Vulnerable areas
- Installation boundary

Impact Risk/Sustainability Issues

- Air and water quality
- Landuse changes
- Noise
- TES/Habitat alteration
- Wetlands
- Cultural resources
- Solid waste
- Energy
- ...



Risk
Issue
Report

Activity	Resource Vulnerability														Cumulative Effects
	Land Use	Air Quality	Noise	Water Quality	Wetlands	Water body Mod	Wildlife	Floodplain	Coastal Issues	TES	Heat & Arch Pres	Pollutants	Visual Effects	Energy Usage	LT Productivity
A. Construction															
1. Clearing															0.755
2. Horiz Construction															0.687
3. Vertical Construction															0.927
B. Operations and Maintenance															
1. Ammunition															0.763
2. Unit Activity*															0.696
3. Equipment (unit)															0.917
4. Wastes															0.894
5. Maintenance															0.825
6. Targets															0.927
C. Closure															
1. Dormancy															0.936
2. Clearing															0.827
3. Cleanup															0.763
4. Re-use															0.985
Cumulative	0.752	0.743	0.881	0.791	0.806	0.975	0.829	0.975	1.000	0.749	1.000	0.846	0.956	0.936	0.871
Score															

Modeling
Links

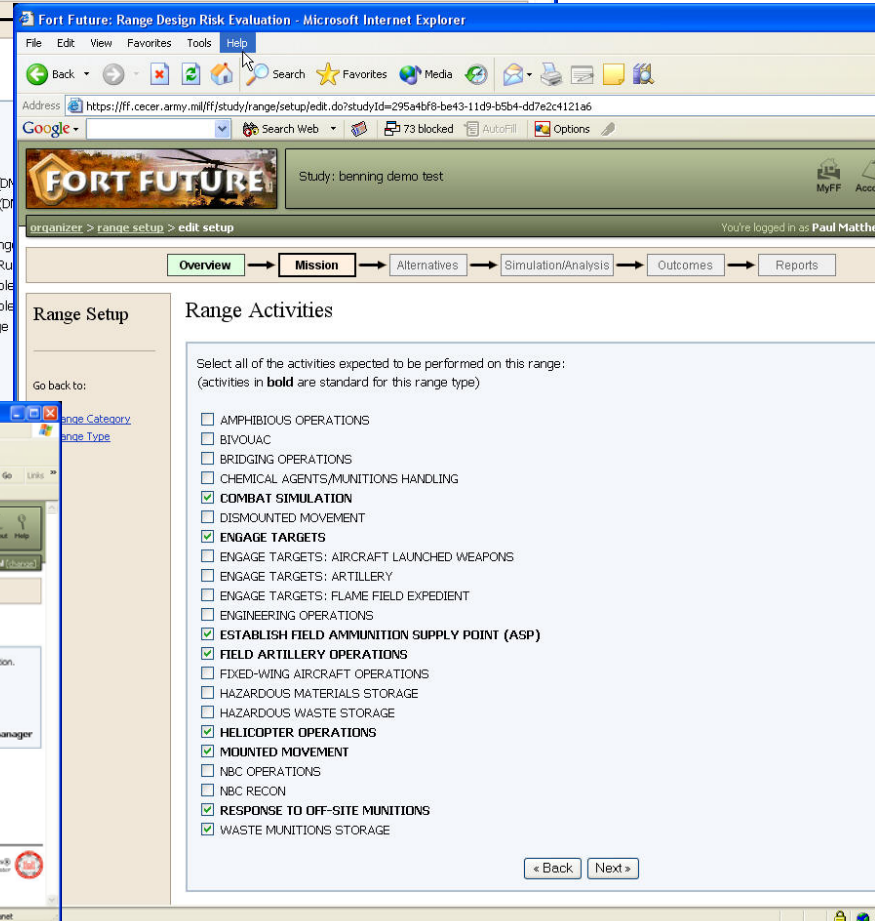
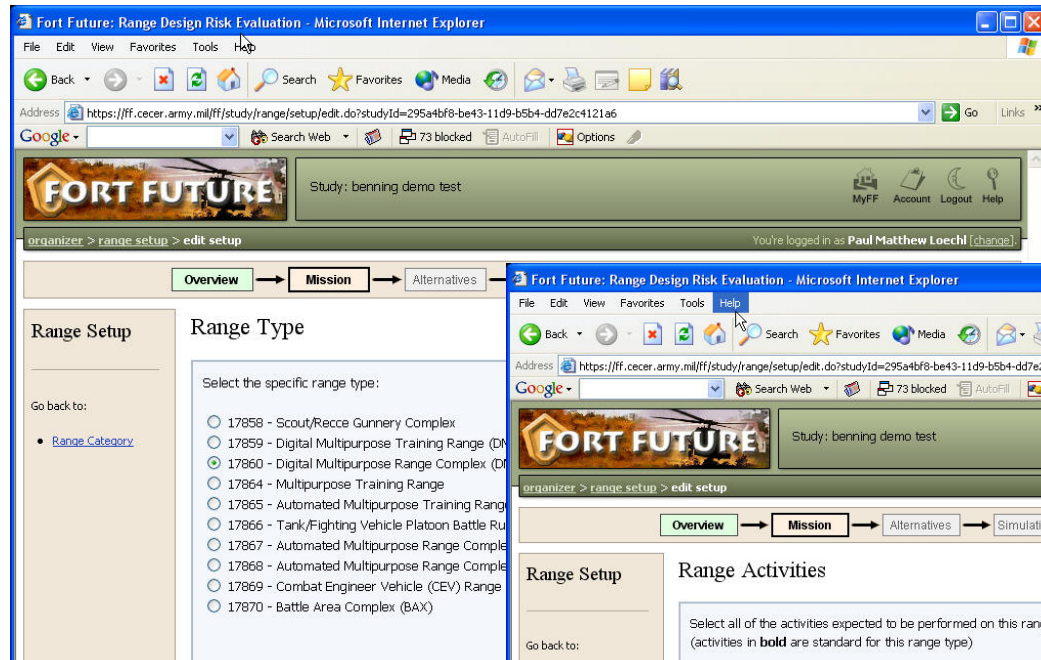
Mitigation
Strategies

Alternatives
Analysis

Range Design Risk Evaluation Tool – *Range Selection*

Range Project Information

- Facility/Activity/Task (FAT) lists
- Size, munitions, construction rqts.

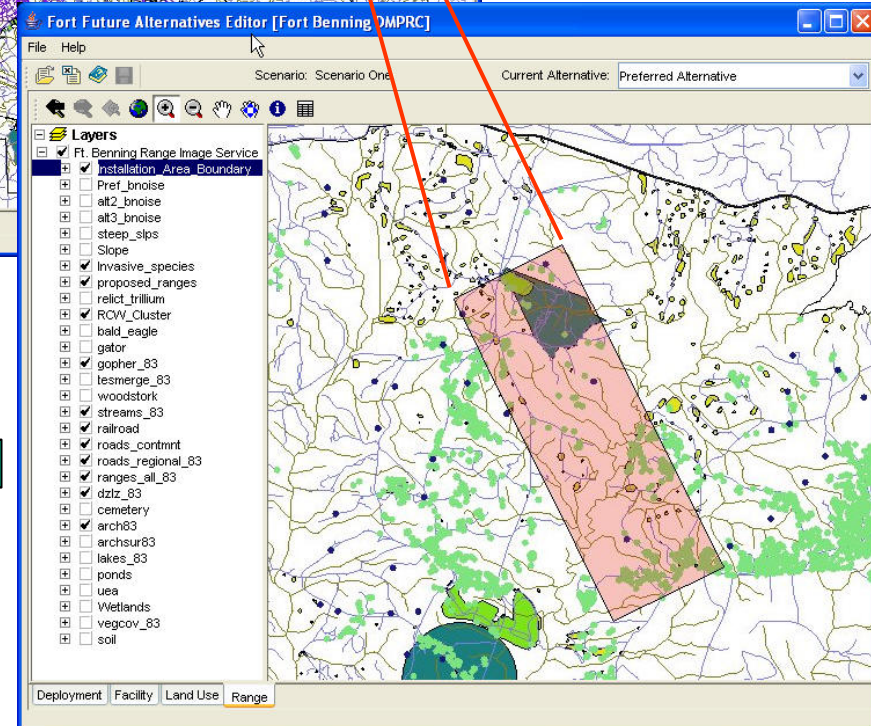
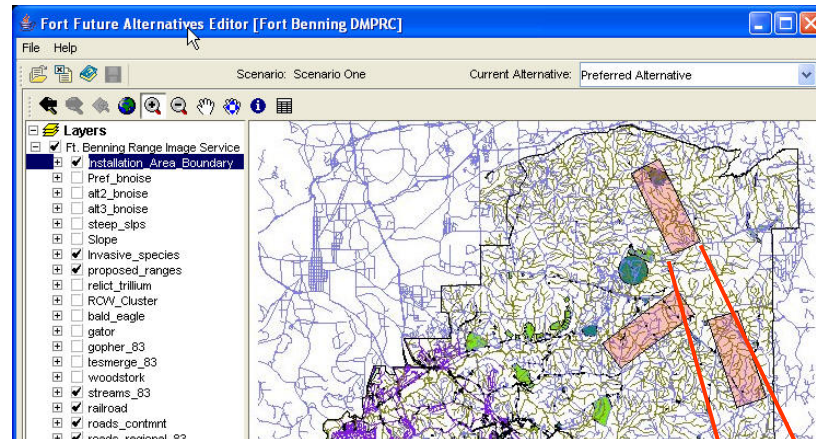


Range Design Risk Evaluation Tool – GIS Analysis

Site Resource Analysis

ITAM Data Layers

- *TES/Species of concern
- *Habitat
- *Roads
- *Railroads
- *Water (Streams, lakes, ponds)
- *Wetlands
- *Cultural resources
- *Soils
- *Vegetation
- *Terrain



Range Design Risk Evaluation Tool – *Issue Analysis*

Impact Issue Analysis

- *Landuse and Traffic Changes
- *Water quality
- *Wetlands
- *Floodplain
- *Coastal zone
- *Water body modification
- *TES/Species of concern
- *Wildlife and Vegetation alteration
- *Cultural resources
- *Energy
- *Air Quality
- *Noise
- *Hazardous materials
- *Visual effects

The image displays two screenshots of the Fort Future Range Design Risk Evaluation tool interface, running in Microsoft Internet Explorer. The top screenshot shows the 'Cultural Resources: Question 4 (of 10)' screen, and the bottom screenshot shows the 'Threatened and Endangered Species / Sensitive Species: Question 3 (of 14)' screen. Both screens include a navigation bar, a study manager, and a list of alternatives.

Top Screenshot: Cultural Resources: Question 4 (of 10)

Navigation: Overview → Mission → Alternatives → Simulation/Analysis → Outcomes → Reports

Study Manager: Alternatives

Question: Do the cultural resources that exist within the APE require consultation with Native American tribes or repatriation?

Answers: ☐ Yes, ☐ No

Buttons: < Back, Next >

Bottom Screenshot: Threatened and Endangered Species / Sensitive Species: Question 3 (of 14)

Navigation: Overview → Mission → Alternatives → Simulation/Analysis → Outcomes → Reports

Study Manager: Alternatives

Question: If so, has the appropriate Federal agency been consulted?

Answers: ☐ Yes, ☐ No

Buttons: < Back, Next >

Text: If you need guidance on this question, ask the Natural resources specialist

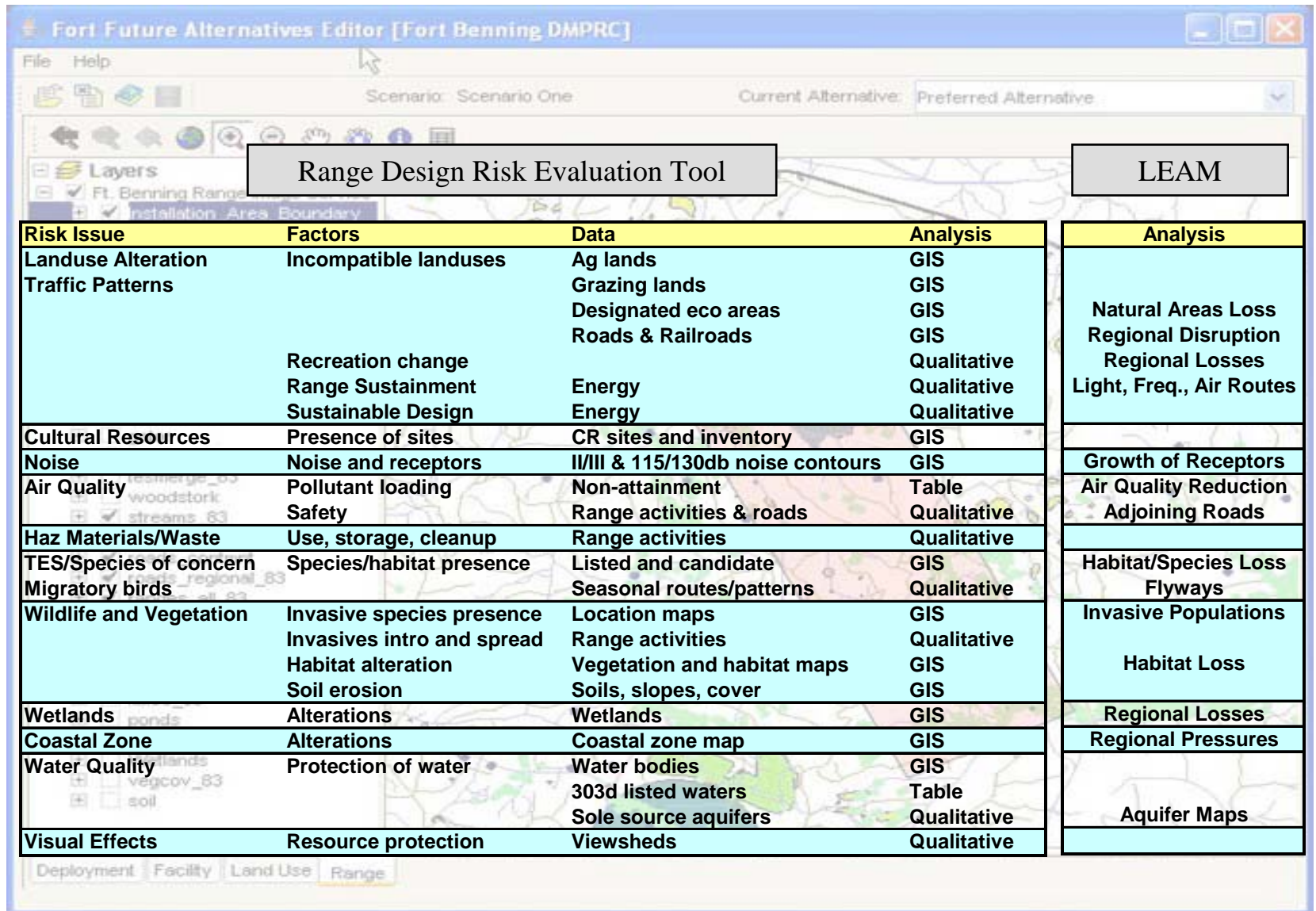
Text: The Endangered Species Act (see [Endangered Species Act](#)) is administered by the Interior Department's U.S. Fish and Wildlife Service (USFWS) (at url [US Fish and Wildlife Service](#)) for terrestrial and freshwater organisms, and by the Commerce Department's National Marine Fisheries Service (NMFS) (at url [National Marine Fisheries Service](#)) for marine species such as salmon and whales.

Text: If you wish to change your answer to a previous question, you may jump to the beginning of a previous topic section: (all questions from that point forward must be answered again)

Topic sections: General, Cultural Resources, Coastal Zone, Externalities, Land Use and Traffic patterns, Noise, Water Body Modifications, Energy Use, Air Quality, Water Quality, Wetlands, Visual Effects, Threatened and Endangered Species / Sensitive Species, Floodplain, Hazardous Materials / Hazardous Waste, Wildlife and Vegetation Alterations

Footer: U.S. Army Corps of Engineers, Engineer Research & Development Center

Issue Analysis Within and Outside of the Installation



Fort Future Alternatives Editor [Fort Benning DMPRC]

File Help

Scenario: Scenario One Current Alternative: Preferred Alternative

Range Design Risk Evaluation Tool

Risk Issue	Factors	Data	Analysis
Landuse Alteration	Incompatible landuses	Ag lands	GIS
Traffic Patterns		Grazing lands	GIS
		Designated eco areas	GIS
		Roads & Railroads	GIS
	Recreation change		Qualitative
	Range Sustainment	Energy	Qualitative
	Sustainable Design	Energy	Qualitative
Cultural Resources	Presence of sites	CR sites and inventory	GIS
Noise	Noise and receptors	II/III & 115/130db noise contours	GIS
Air Quality	Pollutant loading	Non-attainment	Table
	Safety	Range activities & roads	Qualitative
Haz Materials/Waste	Use, storage, cleanup	Range activities	Qualitative
TES/Species of concern	Species/habitat presence	Listed and candidate	GIS
Migratory birds		Seasonal routes/patterns	Qualitative
Wildlife and Vegetation	Invasive species presence	Location maps	GIS
	Invasives intro and spread	Range activities	Qualitative
	Habitat alteration	Vegetation and habitat maps	GIS
	Soil erosion	Soils, slopes, cover	GIS
Wetlands	Alterations	Wetlands	GIS
Coastal Zone	Alterations	Coastal zone map	GIS
Water Quality	Protection of water	Water bodies	GIS
		303d listed waters	Table
		Sole source aquifers	Qualitative
Visual Effects	Resource protection	Viewsheds	Qualitative

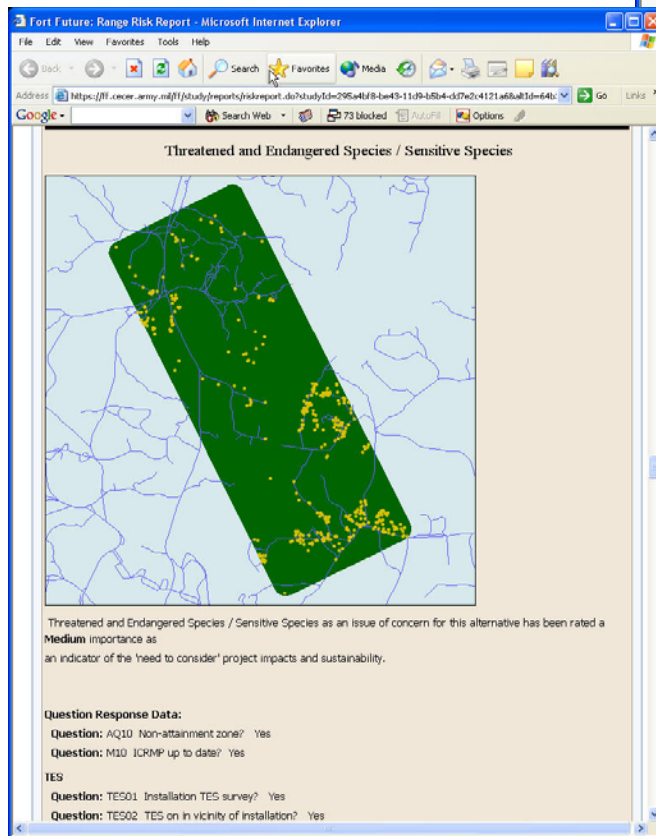
LEAM

Analysis
Natural Areas Loss
Regional Disruption
Regional Losses
Light, Freq., Air Routes
Growth of Receptors
Air Quality Reduction
Adjoining Roads
Habitat/Species Loss
Flyways
Invasive Populations
Habitat Loss
Regional Losses
Regional Pressures
Aquifer Maps

Deployment Facility Land Use Range

Range Design Risk Evaluation Tool – *Risk Report*

Calculate and Display Impact Risk



organizer > study > reports

You're logged in as Paul Matthew Loech [change]

Overview → Mission → Alternatives → Simulation/Analysis → Outcomes → Reports

Range Risk Matrix

	Land Use and Traffic Patterns	Air Quality	Noise (mitigated)	Water Quality	Wetlands	Water Body Modifications	Floodplain	Coastal Zone	Wildlife and Vegetation Alterations	Threatened and Endangered Species / Sensitive Species	Socio-economic and Long-term Productivity	Hazardous Materials / Hazardous Waste	Visual Effects	Cultural Resources	Energy Use
1 Construction	1.000	0.915	0.963	0.950	0.946	0.946	0.981	0.963	0.981	0.974	0.981	0.970	0.981	0.963	0.955
a. Clearing	1.000	0.935	0.957	0.990	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.990	1.000	1.000	0.985
b. Horiz Construction	1.000	0.895	0.941	0.912	0.890	0.890	0.982	0.965	0.962	0.947	0.962	0.950	0.962	0.925	0.926
c. Vertical Construction	1.000	0.915	0.962	0.951	0.947	0.947	0.982	0.965	0.982	0.975	0.982	0.970	0.982	0.964	0.955
2 Operations & Maintenance	1.000	0.902	0.978	0.966	0.959	0.959	0.990	0.991	0.990	0.985	0.992	0.980	0.992	0.984	0.982
a. Ammunition	1.000	0.907	0.963	0.946	0.946	0.946	0.982	0.984	0.982	0.974	0.982	0.968	0.982	0.963	0.970
b. Unit Activity	1.000	0.890	0.951	0.941	0.933	0.933	0.977	0.980	0.977	0.968	0.992	0.980	0.992	0.984	0.963
c. Equipment (unit)	1.000	0.890	0.962	0.951	0.947	0.947	0.982	0.985	0.982	0.975	0.982	0.970	0.982	0.964	0.970
d. Wastes	1.000	0.910	0.992	0.990	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	1.000	1.000	1.000
e. Maintenance	1.000	0.905	0.990	0.980	0.981	0.981	0.987	1.000	0.987	0.986	0.997	0.985	0.997	0.994	0.993
f. Targets	1.000	0.910	0.992	0.990	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.980	1.000	1.000	1.000
3 Closure	1.000	0.938	0.985	0.935	0.923	0.946	0.974	0.978	0.974	0.963	0.974	0.963	0.982	0.948	0.961
a. Dormancy	1.000	0.940	0.986	0.937	0.934	0.957	0.978	0.980	0.978	0.969	0.978	0.964	0.985	0.956	0.964
b. Clearing	1.000	0.935	0.984	0.929	0.911	0.934	0.970	0.972	0.970	0.958	0.970	0.960	0.978	0.940	0.958
c. Cleanup	1.000	0.935	0.984	0.929	0.911	0.934	0.970	0.972	0.970	0.958	0.970	0.960	0.978	0.940	0.958
d. Re-use	1.000	0.940	0.986	0.945	0.934	0.957	0.978	0.980	0.978	0.969	0.978	0.968	0.985	0.956	0.964
Cumulative	1.000	0.778	0.928	0.858	0.856	0.856	0.945	0.951	0.945	0.924	0.948	0.915	0.956	0.898	0.902
Score with significance	1.000	0.778	0.928	0.858	0.856	0.856	0.945	0.951	0.945	0.924	0.948	0.915	0.956	0.898	0.902

< Back

Range Risk Analysis Report

Range Design Risk Evaluation Tool - *Mitigation*

Factor in Mitigation

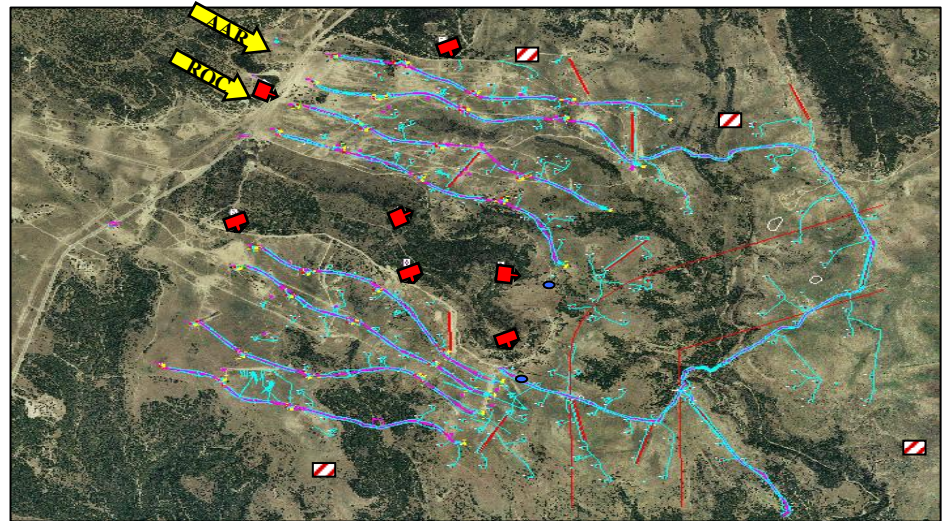
The screenshot displays the 'Fort Future: Range Design Risk Evaluation' tool in a Microsoft Internet Explorer browser window. The address bar shows a URL from the cecer.army.mil domain. The 'Study Manager' sidebar on the left lists 'Alternatives' with a link to 'Manage Alternatives'. The main content area is titled 'Mitigation' and contains instructions for entering mitigation strategies and their costs. Below the instructions, there are two sections: 'Land Use and Traffic patterns' and 'Air Quality', each with a table for entering mitigation strategies, rates, and costs. The 'Land Use and Traffic patterns' section shows a 'default strategy' with a 0% mitigation rate and \$0 cost. The 'Air Quality' section shows a 'default strategy' with a 0% mitigation rate and \$0 cost. At the bottom of the screenshot, a table titled 'Regional Average Costs and Ranges per acre for Ground and Aerial Application of Herbicides' is displayed, showing average costs and ranges for Pacific Coast, Intermountain, Northern Great Plains, and Southern Great Plains regions.

Regional Average Costs and Ranges per acre for Ground and Aerial Application of Herbicides

REG_NAME	EST_TYPE	HERB_APP	
		GRD_APP	AERIAL_APP
Pacific Coast	Average	14.28	13.50
	Range	10.00-35.00	12.00-15.00
Intermountain	Average	12.80	11.60
	Range	3.00-35.00	4.00-23.00
Northern Great Plains	Average	6.75	5.07
	Range	1.00-20.00	2.00-14.00
Southern Great Plains	Average	10.42	12.40
	Range	2.50-22.70	2.50-42.69

Tool Benefits

- Fast, low cost analysis
- Introduces environmental considerations early; scoping and planning
- Interactive: aids analysis and decision-making
- Initiates data collection; utilizes standard Army GIS datasets
- Allows for incorporation of numeric models and databases
- Web-based tool



A silhouette of a soldier in profile, facing right, operating a machine gun. The soldier is wearing a helmet and has a rifle slung over their shoulder. The machine gun is mounted on a tripod. The background is a warm, orange-hued sky, suggesting a sunset or sunrise. The overall image has a grainy, high-contrast aesthetic.

Paul Loechl

ERDC-CERL

Range Design Risk Evaluation Tool™

<http://ff.cecer.army.mil/ff>

217-373-5892

RANGE MANAGERS TOOLKIT (RMTK)

Range Managers Toolkit (RMTK)



Sharing Future Space
Urbana, IL
11 Apr, 2006
Michelle Swearingen
ERDC – Champaign, IL



RANGE MANAGERS TOOLKIT (RMTK)

– RMTK Working Group and Functional Requirements

- Joint Army/USMC Azimuth

- RMTK WG:

- » ATSC



- » USAEC



- » TRADOC Safety



- » ERDC



- » USMC Range and Training Area Management (RTA)



- New requirements developed by joint (Army/USMC) RMTK WG

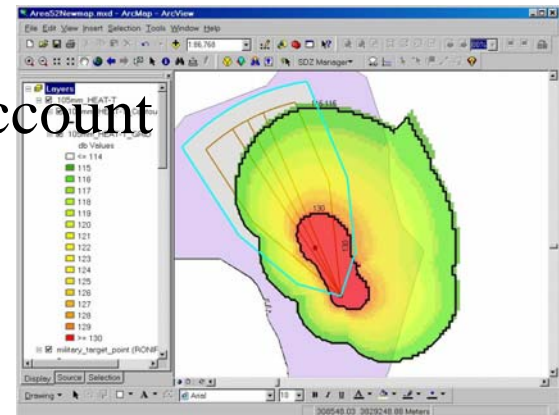
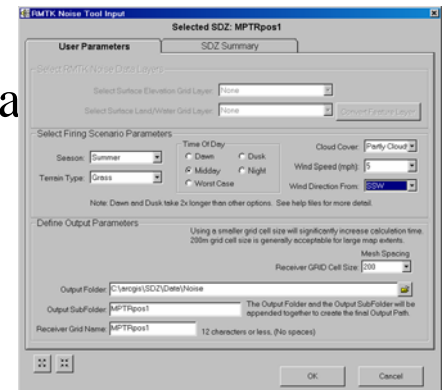


RANGE MANAGERS TOOLKIT (RMTK)

- Requires ESRI ArcGIS 8.3 or 9.0
- Currently Available:
 - SDZ Tool
 - Noise Tool
 - Laser Tool
- Future Development:
 - Range Design and Planning Tool (in testing)
 - Temporary Ammo Storage Locator
 - WebSDZ

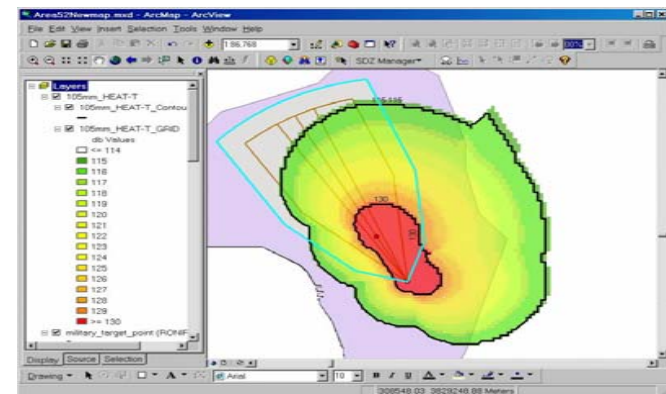
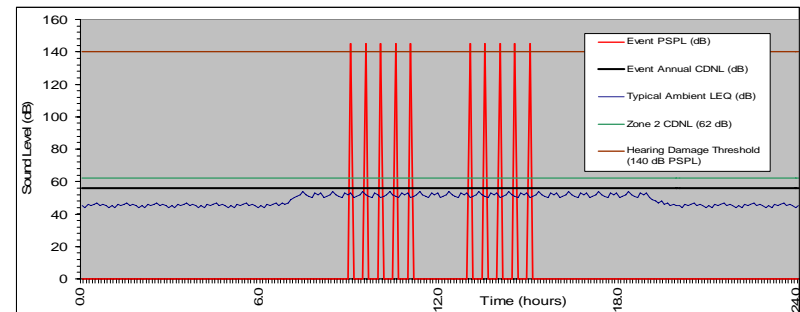
RMTK Noise Tool - Overview

- RMTK Noise Tool
 - Blast noise impact assessment model
 - Predicts likelihood of receiving a noise complaint
 - Single event, not long-term average
 - Predicts PK15(met) levels
 - In-line with updates coming in AR 200-1
 - 85% solution
 - Explicitly takes weather into account
 - Time of Day
 - Season
 - Cloud Cover
 - Wind Speed / Direction



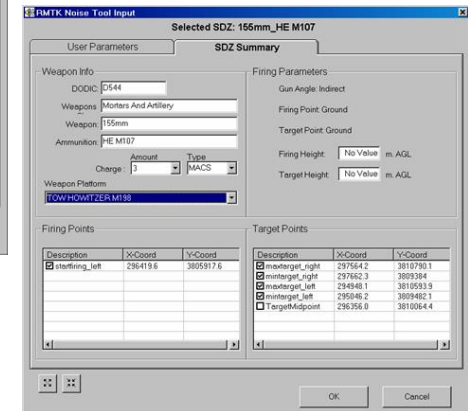
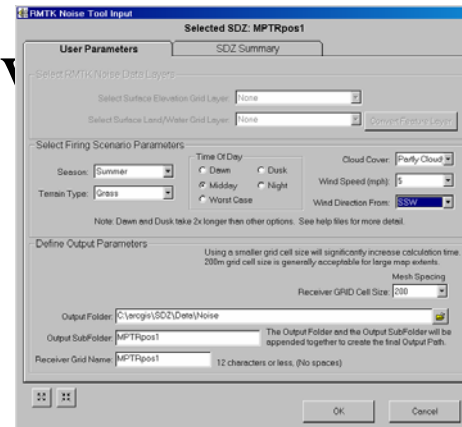
RMTK Noise Tool - Output

- PK15(met) noise contours
 - In-line with shift away from “average noise level” (DNL)
 - Peak level only exceeded 15% of the time based on weather statistics, i.e. the 85% Solution
- Color-coded to “complaint risk”
 - Likelihood of receiving a noise complaint due to a particular noise level
 - Thresholds for large weapons and demolitions:
 - 130 dB = high risk
 - 115 dB = low risk



RMTK Noise Tool - Input

- Noise levels are heavily dependent upon:
 - Weather
 - Source
 - Type
 - Munition used
 - Directivity
 - Firing and Target locations
- RMTK Noise utilizes all of the above information



RMTK Noise Tool – Intended Usage

- “The RMTK Noise Tool is designed to be a day-to-day planning tool for Range Control personnel. The output is designed to give Range Officers a “head’s up” on potential noise impacts on both on- and off-post communities based on current or expected weather conditions. “
- “The RMTK Noise Tool does not provide noise mitigation assistance beyond scheduling in terms of both time and location. The RMTK Noise Tool output is not intended for official documents or general public release. “

RMTK Noise Tool

- Availability
 - Army SRP Website
<https://srp.army.mil>
 - USMC TECOM
<https://rtam/tecom/usmc.mil>
- Planned Updates
 - FY06
 - Incorporate Terrain and Water effects
 - FY07
 - Small arms capability

POC Army:
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DSN 826.2084
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POC USMC:
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Management Division (C465)
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